Powerware P93 (9330-20) UPS

P93 features

▶ UPS is pre-architected, tested and optimized for eServer and storage applications

▶ Pre-installation site evaluation*

▶ Includes UPS installation and start-up service*

▶ Output distribution with breakers, cables and receptacles

▶ ProActive 1-year service plan

▶ Exclusive 5-year onsite warranty offered through IBM with IBMSERV coordination

UPS benefits

▶ Maximum availability – with true double-conversion online design, the proven technology that is used for the most mission-critical applications in the world

▶ Maximum efficiency – the Powerware P93's advanced design features efficiency of up to 93%, the highest for a double-conversion online UPS in its kVA range

▶ Maximum performance – the Powerware P93 delivers the highest performance by using digital signal processing, true pulse-width-modulation and maximum IGBT responsiveness. This provides easy setup, drift-free operation and a pristine output

*When purchased with Powerware Field Installation, PN 103003671, IBM PN 97P3604

IBM Server *Proven*™

Ideal applications

▶ iSeries 870 and 890

▶ pSeries 655, 670 and 690

▶ Enterprise Storage Server Model 800

▶ Cluster Server 1650

Designed specifically to meet the high-availability needs of critical 24x7 applications for small to medium-size business, the Powerware P93 delivers enhanced system reliability and the highest efficiency ratings of any online UPS in the 20 kVA range. The P93 also contains high-end features and benefits that only existed in larger capacity UPS, until now.

The advanced features of the Powerware P93 include:

Digital signal processing and pulse-width modulation

True pulse-width modulation is achieved through the use of digital signal processing, which enables the IGBTs to works at their highest capacity, increasing system reliability and ensuring perfect power on the output.

Built-in control area network (CAN)

An integral internal and external Control Area Network (CAN) is incorporated into the Powerware P93 that assists in seamlessly integrating peripherals and options, controllable from the control panel. It also reduces the internal wiring connections required therefore increasing overall system reliability.

Superior cooling design

The superior cooling design of the Powerware P93 draws from Powerware's extensive, almost 40 years of industry and product development experience. This design, which features redundant fans, ensures that more thermally sensitive areas are cooled first.

Comprehensive communications and user interface

A large display, mimic and control panel is ergonomically situated for operator interface with the unit. The soft keypad helps guide the operator through all menus and setups. A dedicated micro-processor had been designed and engineered to provide full-featured monitoring and extensive alarm history. It allows for additional communication options like Internet accessibility, Ethernet, network links, and modems.

Internal battery

The Powerware P93 comes with internal batteries that provide up to 17 minutes of backup at full load. The batteries are easily accessible and maintained through front access slide-out trays. DC Expert Plus™ internal battery management system significantly enhances battery life.

POWERWARE®

Powerware P93 - Advanced Technology

The Powerware P93 offers a complete feature set to deliver the highest performance in the 20 kVA range of UPS. Whether chosen for an IT or facility environment, locally or remotely located, the Powerware P93 is the only choice to keep your business in business – around the clock.

Advanced ergonomically designed user interface panel

- Easily accessed from a standing position, panel is tilted 15 degrees for optimum viewing
- Large LCD panel for graphic displays (4 line by 40 characters)
- LED status indicators
- Soft keys provide easy navigation through info screens
- Smart Load Off button prevents unintentional load losses
- Multi-lingual LCD panel meets global requirements
- Current status, history, events and alarms and an active mimic bus can be viewed

Superior cooling design

- Air filters prevent contaminants from entering the UPS
- Redundant fans provide continuous operation without derating if a fan fails
- Fan failure detection and notification
- Load-based fan speed control maximizes fan life and efficiency while minimizing audible noise and heat dissipation
- Fans easily replaced while online

Easy installation

- Casters provide for easy placement of unit
- Multiple wire entry locations
- Simple installation of communication option cards
- Terminal blocks for input/output wiring
- Front covers designed with magnetic latches for effortless removal and replacement

Exceptional design for service

- Front and top access for service
- Dedicated service port prevents any disturbance to the customer's communication setup
- Battery circuit breaker
- Internal maintenance bypass switch provides isolation for safe servicing
- Input circuit breaker
- Slide out battery trays with quick disconnects

Bundled communications package

- iSeries interface port and cable (25 ft.)
- Modem for 7x24 remote monitoring and Advance Response Service[1]
- RS-232 port (DB-9)
- (4) Building alarm inputs
- (2) Summary contacts
- (2) Unused communication slots, supports up to two different communications options

Other standard features include:

- UL 1778
- cUL CAN/CSA C22.2 No 107.1
- Exceeds IEC 62040-3, UPS definition
- Double-conversion online technology
- Cold-start capability from battery
- Wide input voltage and frequency window
- Dual source input to rectifier and bypass
- Quiet operation, less than 60 dBA
- ProActive 1 year service plan[2]
- THD input filter
- Installation[3]

- 7x24 startup
- Line up and match options cabinet containing
  - External maintenance bypass
  - 42-pole distribution panel
  - Branch output breakers with output distribution cables and receptacles (outlets) with various configurations to support a variety of device configurations.
  - Support dual redundant power needs of IBM devices

Powerware P93

1. Requires customer provided phone line. Includes one-year ProActive Service. 2. Additional years of ProActive Service available. See Options section for details. 3. When purchased with Powerware Field Installation, PN 10300671, IBM PN 973604.

DC Expert Plus™ Built-in Battery Monitoring

Real-world business applications require a complete range of battery management and testing features, including battery runtime remaining, lifetime remaining, battery health, and notification, to help make critical decisions, from scheduling preventive maintenance to load shedding. Advances in firmware, digital technology and battery monitoring techniques enable the Powerware P93 to offer sophisticated battery management features, previously available only in expensive add-on systems. By ensuring optimal battery health and availability, DC Expert Plus raises the reliability of the Powerware P93 far beyond any other UPS in this kVA range.

DC Expert Plus advanced features include:

▶ **Powerware Battery Lifetime Monitor** uses measures of chronological time, number of battery discharges, battery temperature, and system loading to determine battery lifetime remaining.

▶ **Battery Runtime Remaining Monitor** uses system loading plus internal sensing points for voltage and current data to calculate runtime remaining.

▶ **Advanced Battery Management (ABM®)** uses patented three-stage charging technique that not only increases battery service life, but also optimizes recharge time.

▶ **Battery Circuit Test (BCT)** performs a periodic test of the battery string to ensure that there are no open circuits that would jeopardize battery performance and system availability.

▶ **Temperature Compensated Charging (TCC)** monitors the battery temperature and through sophisticated algorithms adjusts the rate of charge, compensating for the ambient temperature to prolong the life of the battery.

▶ **Intelligent Battery Protection (IBP)** automatically adjusts the shutdown voltage of the batteries based on the length of the AC outage. This prevents severe battery discharge if the system is lightly loaded.

Intelligent Communications

The intelligent communications capability of the Powerware P93 family of UPS means improved reliability, easier network power management and expanded network communications. With both hardware and software communications options, Powerware provides the right communications solution for your specific situation.

LanSafe

LanSafe version 5 delivers comprehensive support including graceful, remote shutdown of UPS systems and network monitoring tools via serial, USB, and network connectivity options. LanSafe's exclusive SafetyNet Technology provides Network Shutdown functionality and enables network administrators to shut down the most critical equipment last.

Powerware Extensions for IBM Director

Powerware Extensions for IBM Director provide seamless integration of Powerware UPSs into the Director management system. The Extensions for IBM Director simplify network management tasks for critical elements of server power protection. System administrators can easily monitor, diagnose, configure, set alarms, schedule self-tests, check battery, gather inventory information, and control Powerware UPSs network wide from a single console within IBM Director.

PowerVision®

PowerVision power management software can monitor up to 64 network devices, provide data archiving and analysis to prevent power problems, and offers sophisticated notification, plus Modbus® connectivity. Through its easy-to-use graphical user interface, PowerVision provides critical information about the power, network-wide, in real time.

FORESEER®

FORESEER environmental monitoring software puts an end to worries about risks to your critical foundation equipment and systems. From air conditioners to water cooling systems, generators to UPS, FORESEER gives you up-to-the-minute information about any system or device that is fundamental to your system availability. Plus, with its unique data archiving capabilities, FORESEER can identify potential problems before they occur, and notify you so you can implement a solution before a crisis.

ConnectUPS Adapters

Powerware's ConnectUPS-X and communications adapters provide a self-contained link between the UPS and the Ethernet LAN/WAN. Using HTTP, Telnet or SNMP, you can easily monitor, manage, and shut down or reboot remote UPS-protected servers, routers, hubs and other key network devices in a controlled manner. These adapters are also compatible with many third-party network management software packages.

Connectivity - what you need by application

Solution	zSeries	iSeries	pSeries	xSeries	Storage	Networking
LanSafe software			x	x		
LanSafe software & ConnectUPS MultiServer card, IBM FC 2933			x	x		
NetWatch software & ConnectUPS Web/SNMP card, IBM FC 2934	x		LPARS[1]	x	x	x
IBM Director Snap-in				x	x	x
PowerVision software	x		x	x	x	x
FORESEER Software	x		x	x	x	x
ConnectUPS relay card & AS400 cable, IBM FC 2936		x				

NOTE: One (1) X-Slot relay card and interface cable included with P93. 1. Use ConnectUPS Web/SNMP/xHub card, IBM FC 2934 to support LPAR (POWER 4 Chip Set) servers. For pSeries configurations: each LPAR needs a network connection and will install Powerware provided NetWatch or LanSafe V software.

P93 Options

ProActive service – additional year(s) plan description

▸ 7x24 corrective maintenance coverage

▸ 7x24 annual performance check

▸ Annual power protection audit

▸ 7x24 remote monitoring advance response

▸ Monthly UPS performance report with web access to account information and site service activity

	Powerware Part Number	IBM Feature Code	IBM Part Number	Per P93 Minimum	Maximum
Concurrent with UPS purchase	155102012-001	7001	97P2657	0	4
Non-concurrent to UPS purchase	155102013-001	7002	97P2658	0	4

Connectivity

ConnectUPS X-Slot Web/SNMP/xHub card (10/100Mb)

The ConnectUPS-X Web/SNMP/xHub card provides real-time UPS monitoring and control of power throughout both 100Mb and 10Mb networks. When used in conjunction with NetWatch Client software, it also provides graceful shutdown of the operating system of up to 255 computers powered by a single UPS. The advanced features of the ConnectUPS-X include:

▸ Real-time, enterprise-wide monitoring provides valuable information for analysis of critical power conditions and problem identification

▸ Supports 100Mb and 10Mb Ethernet networks

▸ Built-in three ports switching hub adds three 10/100Mb network connections with no additional expense

▸ Monitoring via Web using computer (through standard Web Browsers, e.g. Internet Explorer and Netscape). PDA or cell phone provides easy, anywhere, anytime access

▸ Monitoring via SNMP using Network Management Software packages (e.g. Tivoli, CA Unicenter and HP Openview)

▸ Analysis of chronic power problems and determination of trends through data logging and sophisticated graphic tools

ConnectUPS MultiServer Card

The ConnectUPS MultiServer card is an X-Slot connectivity device that provides serial connection to up to five computers for unattended, graceful shutdown and power monitoring. The card operates in conjunction with LanSafe software (included with UPS). The advanced features of the MultiServer card include:

▸ Real-time monitoring of critical power parameters

▸ Graceful, unattended shutdown of multiple computers

▸ Maximizes uptime of more critical loads through operation in tandem with load segment feature of UPS

▸ Supports simple signaling (relay contacts) through additional DB-9 port

Relay Interface Card

The Powerware Relay Interface card is an X-Slot connectivity device that provides monitoring of UPS status through isolated, dry contact, Form-C relays. It also provides the interface for AS/400 computers as well as many industrial applications. The advanced features of the Relay Interface card include:

▸ Isolated, dry contact, Form-C relays for "utility failure", "low battery", "UPS alarm /OK" or "on bypass"

▸ User-selectable "normally open" or "normally closed" contacts

▸ Remote shutdown of UPS through integrated shutdown function

▸ Hot-swappable – UPS maintains power to critical applications while changing cards

	Powerware Part Number	IBM Feature Code	IBM Part Number	Per P93 Minimum	Maximum
ConnectUPS X-Slot Web/SNMP card	103002974-5501	2934	53P4619	0	2*
ConnectUPS X-Slot MultiServer card	05146447-3901	2933	04N7027	0	2*
ConnectUPS Relay Interface card & cable	103003564	2936	97P3886	0	2*

Maximum combination of FC 2933, 2934, 2936 and other ConnectUPS X-Slot card options is two. ConnectUPS cards are installed onsite and concurrently with P93 startup by Powerware Service Technician. Customer responsible for software installation.

Output connections

Three (3) NEMA non or locking receptacles (outlets) with breakers and connectors. Each connector shall be on a cord with maximum length of 50 feet. Choose from:

Feature Code	IBM Plug Type	iSeries Feature Code	pSeries Part Number	pSeries Feature Code	zSeries Part Number
5-15R duplex	4	1412, 1413, 2960 + 9082	86G7648	9800	31L7061, 2, 4
5-20R duplex	-	-	-	-	-
L5-15R	7	2960 + 9083, + 9082	-	-	31L7067, 8
L5-20R	-	-	-	-	-
L5-30R	-	-	-	-	-
6-15R	5	1410, 1403, 1411, 1451, 1452, 1457, 2961 & 9082	183576, 4, 3	9909, 9833	-
L6-15R	10	1414, 1416, 1453, 1454, 1458	186G7878, 9	-	31L7070, 1
6-20R	29	1400, 1401, 1423	-	-	-
L6-20R	11	1404, 1406, 1428	-	-	-
L6-30R	12	1424, 1426	11F0113, 4	-	-

	Powerware Part Number	IBM Feature Code	IBM Part Number	Per P93 Minimum	Maximum
Output power cords (NEMA)	103003673	9881	97P2660	0	6*

Hardware installed onsite and concurrent to P93 installation.

Extended Battery Cabinets
Powerware offers a full line of battery cabinets for the Powerware P93.

▸ Battery cabinets may be daisy-chained together for extended battery runtimes, (up to 2).

▸ Integral configuration, which line up and match, is standard.[1]

▸ Front-access-only enhances servicing and installation.

▸ Slide trays and modular battery packaging makes periodic servicing easy.

▸ Cabinets are UL 1778 listed.

▸ Flame retardant batteries meet UL 94V2 for computer room installations.

▸ Wiring installation.[2]

Manufacturer-supplied wiring with quick disconnects provides plug-and-play capability for line-up and match configurations.

A DC rated circuit breaker in each battery cabinet allows multiple battery strings to be serviced independently of each other, assuring back up power is always available to the UPS

Quick disconnects between battery tray assemblies reduce battery maintenance time.

Removable battery slide-out tray assembles provide "front access only" and reduce battery maintenance time.

1. Battery cabinets can be configured as line up and match or remotely located. Customer must provide wiring for remotely located cabinets. 2. If concurrent to P93 Field Installation, Powerware PN 103003671, IBM PN 97P3604.

Battery runtimes (in minutes)

			iSeries			pSeries				Storage		Cluster	
			870	890		655			670	690		2105		1350	1600
			CEC + I/O	CEC + I/O	CEC + I/O	1 node	2 nodes	3 nodes	up to	8 way	32 way	standard	with expansion enclosure	Contact Powerware
	10 kVA	15 kVA	20 kVA	16 way	16 way	32 way	1 I/O	2 I/O	3 I/O	32 way	1 I/O	3 I/O			
	7 kW	10.5 kW	14 kW	6.8 kW	4.9 kW	8.3 kW	3.2 kW	6.4 kW	9.6 kW	6.5 kW	3.2 kW	10.5 kW	6.4 kW	13.8 kW	
Internal battery	45	26	17	48	79	31	110	50	27	49	110	26	50	17	
(1) External battery cabinet	90	65	48	98	150	75	240	110	70	108	240	65	110	48	
(2) External battery cabinets	155	90	75	166	240	130	400	180	96	172	400	90	180	75	

Contact Powerware for runtime, application or configuration assistance.

Calculating runtime - a guide

Typical runtime is 15 minutes
Formula (runtime in minutes) = [business + (2 x system shutdown) + safety]
Business = _____
Shutdown _____ x 2 = _____
Safety = _____
Total = _____

	Powerware Part Number	IBM Feature Code	IBM Part Number	Per P93 Minimum	Maximum	
External Battery Cabinet	A13031	6635	97P2663	0	2	

Additional options

▸ Input/output galvanic isolation

▸ Voltage matching transformers

▸ Remote status panel

▸ Remote EPO button

Powerware P93 Specifications

		P93	Options Cabinet	EBC	ProActive Service		X-Slot Web/SNMP	X-Slot Multi Server	X-Slot Relay	Output power cords	
IBM feature code				6635	7001	7002	2934	2933	2936	9880	9881
IBM part number		97P2653	97P2654	97P2663	97P2657	97P2658	53P4619	04N7027	97P3886	97P2659	97P2660
Input Voltage	Volts	208	-	-	-	-	-	-	-	Quantity (2) 60 A, 3-phase, 4-wire, IEC-309, 460R9W with breakers and connectors.	Quantity (3). See FC 9881 description.
Output voltage	Volts	208	-	-	-	-	-	-	-		
Input/output frequency	Hz	50/60	-	-	-	-	-	-	-		
Input voltage range									-		
Minimum	Volts	177	-	-	-	-	-	-	-		
Maximum	Volts	228	-	-	-	-	-	-	-		
Rectifier input	Amps	52	-	-	-	-	-	-	-		
Bypass input											
Nominal amps	Amps	55.5	-	-	-	-	-	-	-		
AC output											
Nominal	Amps	55.5	-	-	-	-	-	-	-		
10 minutes	Amps	69.4	-	-	-	-	-	-	-		
Battery											
Nominal voltage	Volts	288	-	288	-	-	-	-	-		
Max. charge voltage @ 25°C	Volts	340	-	340	-	-	-	-	-		
Charge current	Amps	7	-	-	-	-	-	-	-		
Nominal discharge current	Amps	52	-	-	-	-	-	-	-		
Total cell count		144	-	144	-	-	-	-	-		
System efficiency											
@100% load	%	92.4	-	-	-	-	-	-	-		
@75% load	%	92.7	-	-	-	-	-	-	-		
@50% load	%	92.9	-	-	-	-	-	-	-		
Maximum heat dissipation											
BTU/hr. (x1000)		3.9	-	-	-	-	-	-	-		
kcal/hr.		990	-	-	-	-	-	-	-		
Inverter efficiency (full load)	%	94	-	-	-	-	-	-	-		
Physical attributes (max.)											
Width	in/cm	22/56	17/52	17/52	-	-	-	-	-	50 ft. (maximum cord)	
Height	in/cm	45/114	45/114	45/114	-	-	-	-	-		
Depth	in/cm	31/79	38/97	31/79	-	-	-	-	-		
Weight installed	lb/kg	958/435	200/90	600/272	-	-	.5/.2	.5	.5/.2	20 lb. each connector	
Point loading	lb/kg	6 @ 160/73	4 @ 50/230	6 @ 145/100	N/A	N/A	N/A	N/A	N/A	-	-
Min/max qty per P93		-	1/1	0/2	0/4	0/4	0/2	0/2	0/2	1/1	0/6

POWERWARE®